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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/077,854	02/20/2002	Hiroiyuki Hoshiya	520.41222X00	3183

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EXAMINER

MAGEE, CHRISTOPHER R

ART UNIT	PAPER NUMBER
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2653

DATE MAILED: 03/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/077,854

Applicant(s)

HOSHIYA ET AL.

Examiner

Christopher R. Magee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 1/13/2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7,9-14,16-24,26 and 27 is/are rejected.
- 7) ☒ Claim(s) 8,15 and 25 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>4</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

- The reply filed 1/13/2004 was applied to the following effect: All relevant objections are withdrawn as being satisfied.

- The indicated allowability of claims 4-7 is withdrawn in view of the newly discovered reference(s) to Dill et al. (US 6,023,395) and . Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7, 9-14, 16-24, 26 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Dill et al. (hereinafter Dill) (US 6,023,395).

- Regarding claims 1, 2, and 16-19, Dill discloses a magnetic head provided with a spin valve type magnetoresistive element in which a ferromagnetic layer 118, which a direction of the magnetization is substantially pinned for an external magnetic field and a soft magnetic free layer 132, the magnetization of which can be turned according to an external magnetic field are laminated via a non-magnetic intermediate layer 120 and characterized in that the magnetization of the soft magnetic free layer 132 is rotated according to the external magnetic field when induced, a relative angle between a direction of the magnetization of the soft magnetic free layer

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132 and a direction of the magnetization of the ferromagnetic layer 118 varies and magnetoresistance is produced (Fig. 4A) wherein:

a single magnetic domain turning ferromagnetic layer 150 is formed on the soft magnetic free layer 132 via a non-magnetic separating layer 152 (Fig. 4A);

the single magnetic domain turning ferromagnetic layer 150 turns the soft magnetic free layer 132 a single magnetic domain so that soft magnetic free layer 132 has magnetization substantially induced in direction substantially perpendicular to an external magnetic field (Fig. 4A).

the soft magnetic free layer 132 and the single magnetic domain turning ferromagnetic layer 150 are magnetostatically coupled via the non-magnetic separating layer 152 at the end of the track width and a closed magnetic circuit is formed, where no ferromagnetic or antiferromagnetic coupling is produced; and

the single magnetic domain turning ferromagnetic layer 150 has effectively fixed magnetization in the direction of substantially perpendicular to an external magnetic field from a magnetic medium (col. 6, lines 25-29).

- Regarding claims 3 and 20, Dill discloses a bias magnetic field being applied to the ferromagnetic pinned layer 118 by laminating the ferromagnetic pinned layer 118 and an antiferromagnetic film 116 or a hard magnetic film (not shown) and producing exchange coupling and the ferromagnetic pinned layer 41 is polarized in direction substantially perpendicular to an external magnetic field (col. 5, lines 38-48; Fig. 4A).

- Regarding claims 4, 6, 7, 13, 14, 21, 23 and 24, Dill discloses the single magnetic domain turning ferromagnetic layer 150 is formed by a hard magnetic film (col. 6, lines 5-14); and

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the hard magnetic film is magnetizing in a direction substantially perpendicular to an external magnetic field (Fig. 4A).

- Regarding claims 5, 12 and 22, Dill discloses single magnetic domain turning ferromagnetic layer formed by a layered film having ferromagnetic or antiferromagnetic coupling between a hard magnetic film and a soft magnetic buffer layer via a coupling film and the magnetization of the hard magnetic film and the magnetization of the soft magnetic buffer layer are polarized in a direction substantially perpendicular to an external magnetic field (col. 12, line 40 to col. 13, line 7).

- Regarding claims 9, 10, 26 and 27, Dill teaches that the non-magnetic layer 152 being formed by a deposition of a layer including at least one of Cu, Au, Ag, Pt, Re, Ru, Ir, Os, Ta, Hf, Nb, Ti and W or a layer including these and a layer made of oxide or a mixture of least one of Cu, Au, Ag, Pt, Re, Ru, Ir, Os, Ta, Hf, Nb, Ti and W and oxide (col. 6, lines 19-24).

Allowable Subject Matter

Claims 8, 15, and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments with respect to claims 1 and 2 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- Seyama et al. (US Patent Application Publication US 2002/0034055) is cited to show a spin valve magnetoresistive sensor having a CPP structure.
- Parkin (US 6,153,320) is cited to show magnetic devices with laminated ferromagnetic structures formed with improved antiferromagnetically coupling films.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher R. Magee whose telephone number is (703) 605-4256. The examiner can normally be reached on M-F, 8: 00 am-5: 30 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Korzuch can be reached on (703) 305-6137. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Christopher R. Magee
Patent Examiner
Art Unit 2653

March 17, 2004



WILLIAM KORZUCH
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